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## (54) Imaging system functioning on submillimeter waves

(57) The invention relates to detection performed over millimeter and submillimeter wavelengths, especially to imaging solutions functioning over a submillimeter-wavelength range. The system of the invention uses detectors, comprising antenna coupled bolometers together with wavelength selective optics. The detector matrix is preferably curved for reducing the number of imaging errors. In order to provide a curved detector matrix, the detector matrix is constituted by flat submatrices, each being provided with one or more integrated antenna coupled bolometers. The detectable frequency range is preferably limited in two stages, first by means of wavelength selective optics and secondly by means of the operating band of the antenna of an antenna coupled bolometer. In order to focus the incoming radiation on bolometers, the bolometer substrate is fitted or the surface or interior of the bolometer substrate is provided with a bolometer lens or a corresponding optical element in alignment with each bolometer.

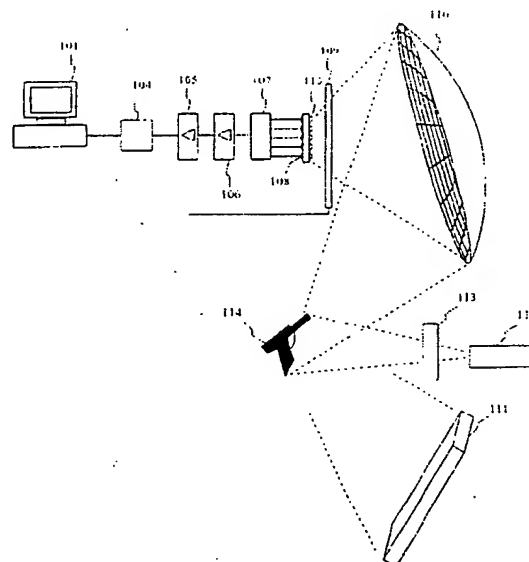


Fig. 2

EP 0 903 566 A2

and in that said bolometer substrates are adapted to provide a detector surface roughly in the shape of a certain curved surface, said certain curved surface being substantially the focal plane of said optical element (110).

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11. A system as set forth in claim 1, **characterized** in that said optical element (110) is adapted to limit the wavelength band of electromagnetic radiation applied to the bolometer substrate. 10
12. A system as set forth in claim 11, **characterized** in that at least one of the surfaces of said optical element (110) is rough, the roughness of said surface being substantially equal to a certain predetermined value. 15
13. A system as set forth in claim 1, **characterized** in that said optical element (110) comprises a lens. 20
14. A system as set forth in claim 1, **characterized** in that said optical element (110) comprises a mirror.
15. A system as set forth in claim 1, **characterized** by comprising a cold surface for enhancing a contrast between an object to be imaged and its background. 25
16. A system as set forth in claim 15, **characterized** in that the cold surface is produced by means of a container of liquid nitrogen, said container being provided with a thermal insulation which comprises a material substantially transparent over the detectable wavelength band. 30
17. A system as set forth in claim 1, **characterized** by comprising a radiation source and a diffuser for lighting an object to be imaged. 35

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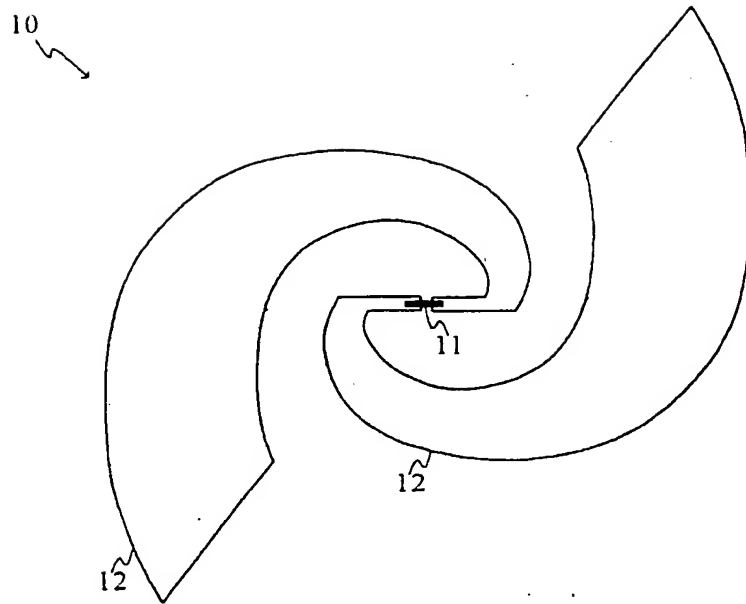


Fig. 1  
PRIOR ART

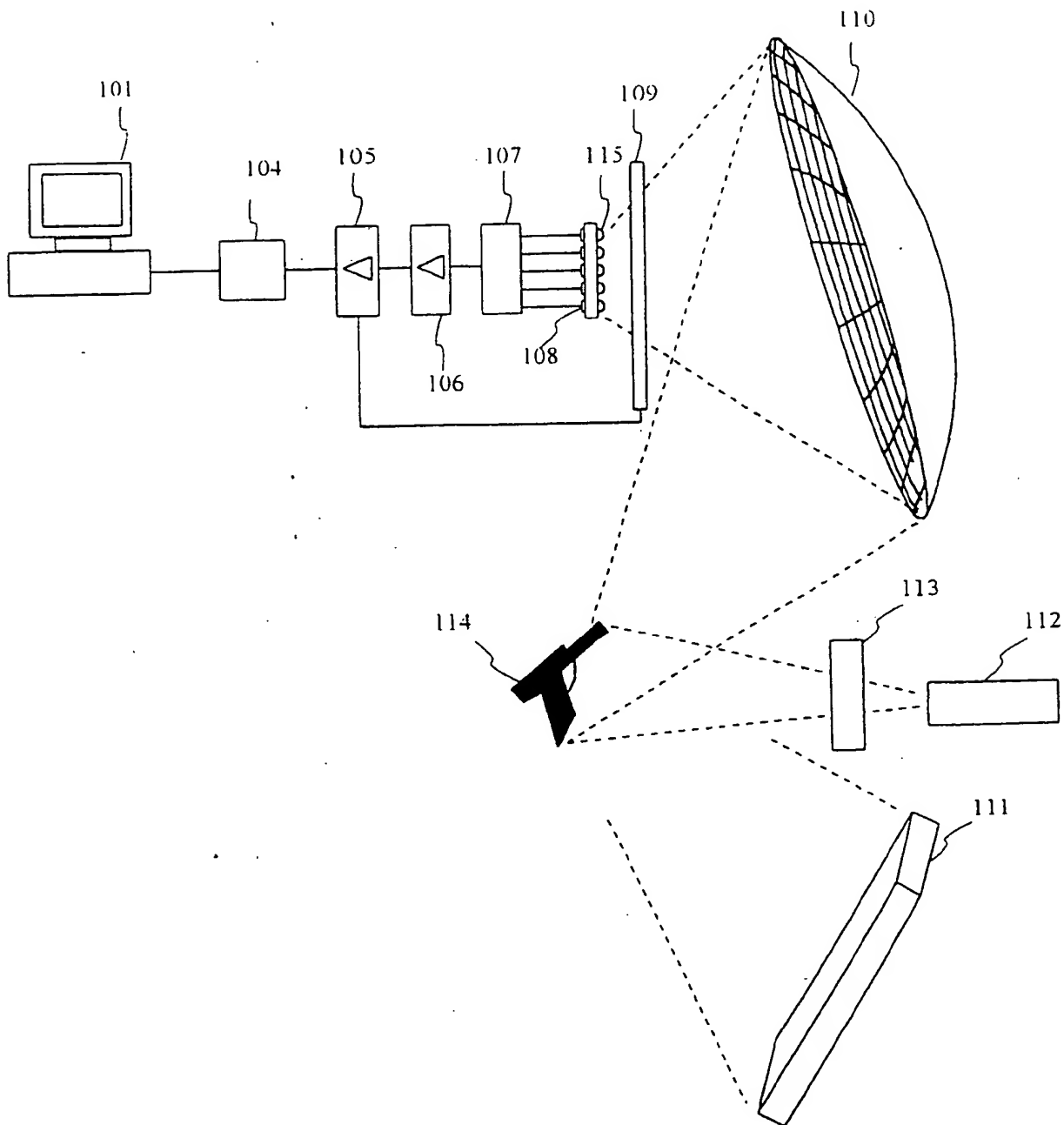


Fig. 2

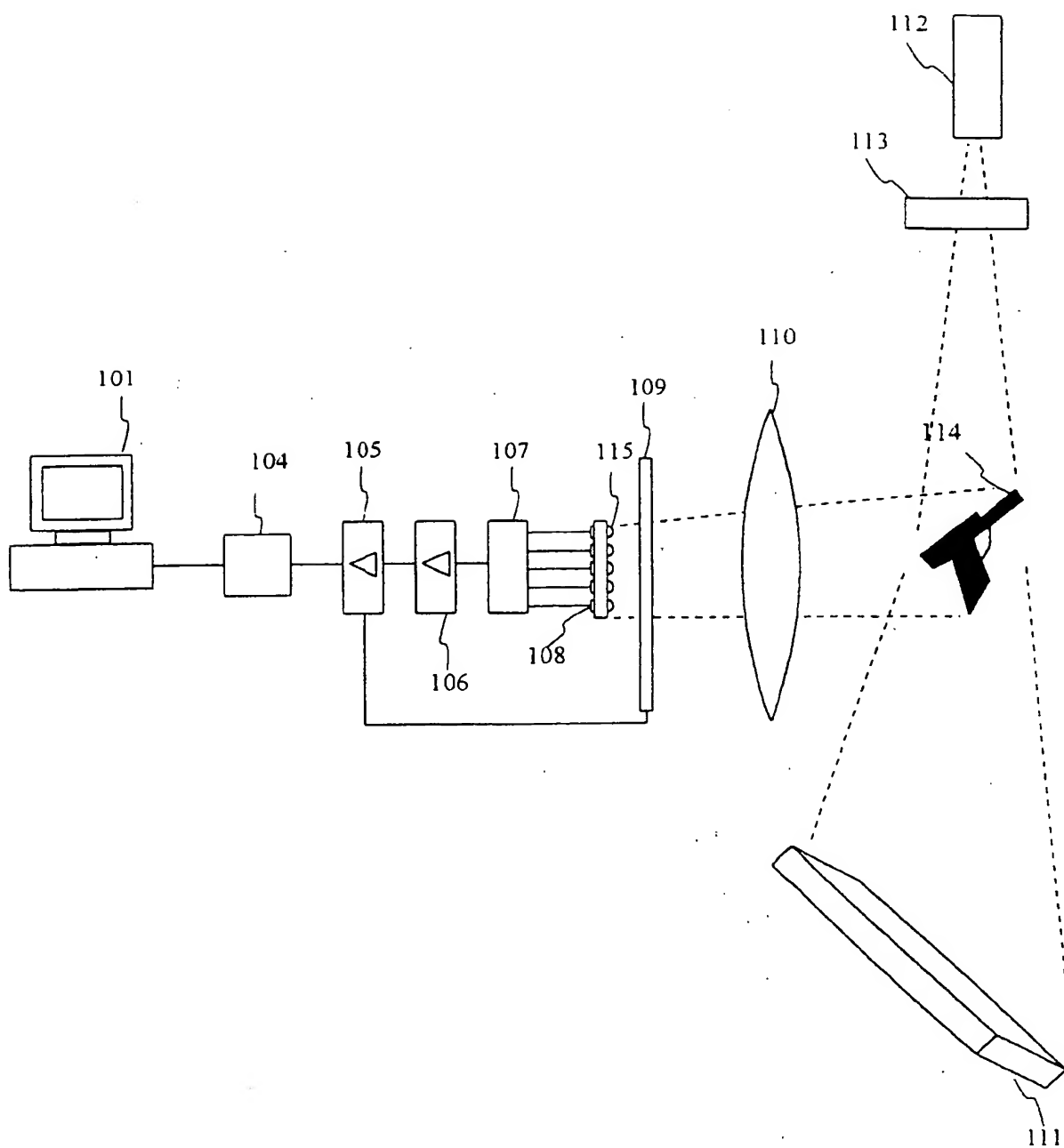


Fig. 3

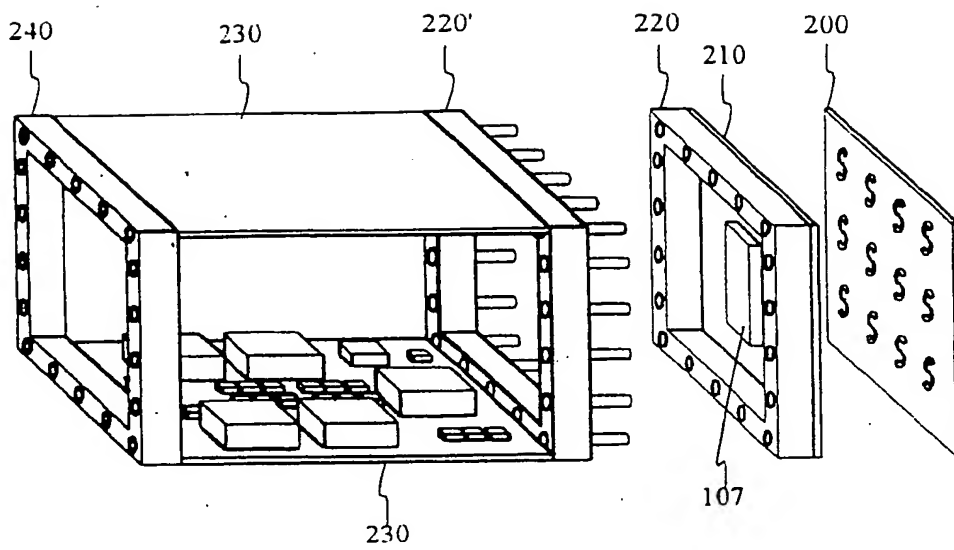


Fig. 4